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10/590,442

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EXAMINER

FEELY, MICHAEL J

ART UNIT

PAPER NUMBER

1796

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

| | | | |
|------------------------------|--------------------------------------|-------------------------------------|--|
| Office Action Summary | Application No. 10/590,442 | Applicant(s) HONMA ET AL. | |
| | Examiner Michael J. Feely | Art Unit 1796 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 October 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4 and 10-49 is/are pending in the application.
- 4a) Of the above claim(s) 17-49 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4 and 10-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Pending Claims

Claims 1-4 and 10-49 are pending.

Priority

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Election/Restrictions

2. Applicant's election without traverse of Group I (claims 1-16) in the reply filed on April 20, 2009 is acknowledged.
3. Claims 17-49 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to nonelected inventions, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on April 20, 2009.

Claim Interpretation

4. In claims 1-4 and 10-12 the recitation "*for carbon-fiber-reinforced composite materials,*" has been given little patentable weight because the recitation occurs in the preamble. A preamble is generally not accorded patentable weight where it merely recites the purpose of a process or the intended use of a structure, and where the body of the claim does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to

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stand alone. See *In re Hirao*, 535 F.2d 67, 190 USPQ 15 (CCPA 1976) and *Kropa v. Robie*, 187 F.2d 150, 152, 88 USPQ 478, 481 (CCPA 1951).

In the instant case, the preamble merely recites the intended use of the composition, wherein the prior art can meet this future limitation by merely being capable of such intended use.

Response to Amendment

5. The rejection of claims 5, 7, and 8 under 35 U.S.C. 102(b) as being anticipated by Honda et al. (US Pat. No. 5,994,429) has been rendered moot by the cancellation of these claims.

6. The rejection of claims 1, 3, and 4 under 35 U.S.C. 102(b) as being anticipated by Honda et al. (US Pat. No. 5,994,429) has been overcome by amendment.

7. The rejection of claims 2, 11, and 12 under 35 U.S.C. 102(b) as anticipated by or, in the alternative, under 35 U.S.C. 103(a) as obvious over Honda et al. (US Pat. No. 5,994,429) has been overcome by amendment.

8. The rejection of claim 6 under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Goto et al. (US 2003/0135011) has been rendered moot by the cancellation of this claim.

9. The rejection of claim 9 under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Qureshi et al. (US Pat. No. 5,087,657) has been rendered moot by the cancellation of this claim.

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10. The rejection of claims 13-16 under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Middleman (US Pat. No. 5,269,863) has been overcome by amendment.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. The rejection of claim 10 under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Qureshi et al. (US Pat. No 5,087,657) stands.

13. Due to amendment, claims 1-4, 11 and 12 are also rejected under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Qureshi et al. (US Pat. No 5,087,657).

Regarding claims 1, 3, 4, and 10, Honda et al. disclose: **(I)** an epoxy resin composition (Abstract) for carbon-fiber-reinforced composite materials (*capable of intended use*: column 3, line 65 through column 4, line 21), comprising the following components [A], [B], [C], and [D]:

[A] epoxy resin (Abstract; column 2, lines 22-35),

[B] amine curing agent (Abstract; column 2, lines 36-44) which is dicyandiamide (Abstract; column 2, lines 36-44; Example 3),

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[C] phosphorus compound (Abstract; column 2, line 45 through column 3, line 23), wherein the concentration of the component [C] is 0.2 to 15% by weight in terms of phosphorus atom concentration (column 3, lines 31-40), and

[D] a curing accelerator (column 3, lines 55-64);

(3) characterized by comprising red phosphorus as the component [C] (Abstract; column 2, line 45 through column 3, line 23); and (4) characterized in that the red phosphorus is coated with a metal hydroxide and/or a resin (Abstract; column 2, line 45 through column 3, line 23).

Honda et al. contemplate the use of any curing accelerator, as long as it is generally used in accelerating curing of an epoxy resin (*see column 3, lines 55-64*). However, they fail to disclose: (1) [D] a compound that has 2 or more urea bonds per molecule; and (10) [D] 1,1'-4(methyl-m-phenylene)bis(3,3-dimethylurea) and/or 4,4'-methylene bis(phenyldimethylurea).

Qureshi et al. disclose a similar epoxy-based composition used for prepregs (*see Abstract; column 3, line 63 through column 4, line 41*). Furthermore, they disclose that the instantly claimed urea-based accelerators are recognized in the art as suitable accelerators for this type of system (*see column 5, lines 16-38, particularly lines 28-29*). As with *accelerators* in general, they are used to increase the rate of cure. In light of this, it has been found that the selection of a known material based on its suitability for its intended use supports a *prima facie* obviousness determination – *see MPEP 2144.07*.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the instantly claimed urea-based accelerators, as taught by Qureshi et al., in the composition of Honda et al. because: (a) Honda et al. contemplate the use of any curing accelerator, as long as it is generally used in accelerating curing of an epoxy resin; and (b) the

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teachings of Qureshi et al. establish that the instantly claimed urea-based accelerators are recognized in the art as suitable accelerators for this type of system.

Regarding claims 2, 11, and 12, the combined teachings of Honda et al. and Qureshi et al. are as set forth above and incorporated herein. They fail to explicitly disclose: **(2)** characterized in that the viscosity of the composition is 10 to 700 Pa's at 60°C; **(11)** characterized in that the specific gravity of the composition is 1.35 or lower; **(12)** characterized in that the composition can be cured within 30 minutes at 150°C.

It appears that the composition of the combined teachings would have satisfied these properties because it satisfies all of the material/chemical limitations of the instant invention. This is particularly the case where little to no inorganic filler is present (*see column 3, lines 31-40 of Honda et al.*). In light of this, it has been found that, "Products of identical chemical composition can not have mutually exclusive properties." A chemical composition and its properties are inseparable. Therefore, if the prior art teaches the identical chemical structure, the properties applicant discloses and/or claims are necessarily present – *In re Spada*, 911 F.2d 705, 709, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

Therefore, it appears that the composition of the combined teachings would have satisfied the instantly claimed properties because it satisfies all of the material/chemical limitations of the instant invention.

14. Claims 13-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honda et al. (US Pat. No. 5,994,429) in view of Qureshi et al. (US Pat. No 5,087,657) and Middleman (US Pat. No. 5,269,863).

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Regarding claims 13, 15, and 16, the combined teachings of Honda et al. and Qureshi et al. are as set forth above and incorporated herein. Honda et al. contemplate the use of glass fabric or cloth to manufacture their prepreg. These preregs are then used to manufacture multi-layer circuit boards (*see column 3, line 65 through column 4, line 21*). However, they fail to disclose: **(13)** a prepreg, prepared by impregnating carbon fiber with the epoxy resin composition for carbon-fiber-reinforced composite materials according to claim 1; **(15)** a fiber-reinforced composite sheet, characterized by comprising a cured resin prepared by curing the epoxy resin composition for carbon-fiber-reinforced composite materials according to claim 1; and carbon fiber; and **(16)** a fiber-reinforced composite sheet, prepared by curing a prepreg according to claim 13.

Middleman discloses similar prepreg materials used to manufacture multi-layer circuit boards (*see column 3, lines 9-25; column 4, lines 33-46*). The teachings of Middleman establish that carbon fibers/fabrics, in addition to glass fibers/fabrics are recognized in the art as suitable reinforcing materials for circuit board preregs. They are functional equivalent materials used to reinforce the prepreg/circuit board structure. In light of this, it has been found that substituting functional equivalents known for the same purpose is *prima facie* obvious – *see MPEP 2144.06*. Such a substitution would have obviously satisfied the instantly claimed invention, as set forth in claims 13, 15, and 16.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the glass fiber/fabric of Honda et al. (*in view of Qureshi et al.*) with carbon/fiber fabric because the teachings of Middleman establish that carbon fiber/fabrics, in addition to glass fiber/fabrics are recognized in the art as suitable reinforcing materials for circuit

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board prepregs. They are functional equivalent materials used to reinforce the prepreg/circuit board structure.

Regarding claim 14, the combined teachings of Honda et al. and Qureshi et al. are as set forth above and incorporated herein. Honda et al. fail to disclose: **(14)** characterized in that the fiber volume content of a prepreg is 30 to 95%.

The teachings of Middleman further establish that the instantly claimed fiber volume content is recognized as a suitable fiber volume content for this type of application (*see column 4, lines 47-56*).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the instantly claimed fiber volume content in the prepreg of Honda et al. (*in view of Qureshi et al.*) because: (a) the teachings of Middleman establish that carbon fiber/fabrics, in addition to glass fiber/fabrics are recognized in the art as suitable reinforcing materials for circuit board prepregs; and (b) the teachings of Middleman further establish that the instantly claimed fiber volume content is recognized in the art as a suitable fiber volume content for this type of application.

Response to Arguments

15. Applicant's arguments filed October 23, 2009 have been fully considered but they are not persuasive.

- *Argument 1 (pages 13-15 of response)*

Applicants argue that the instantly claimed composition, featuring components [A]-[D] shows unexpectedly high flame retardance. Specifically, they argue that the use of an accelerator

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[D] featuring plural urea bonds per molecule, as compared to the use of an accelerator [D] featuring one urea bond per molecule, is responsible for the unexpected high flame retardance. Applicants point to Tables 1, 2, and 6 of the specification for evidence.

In order to truly isolate the effect of [D], it is helpful to hold constant the remaining variables of the composition. Looking at the data provided in Tables 1, 2, and 6, there are three pairs of examples that do this: Examples 1 & 6, Examples 2 & 7, and Examples 15 & 25. Flame retardance is evaluated at three laminate thicknesses: approximately 0.6 mm, approximately 0.4 mm, and approximately 0.2. The following is a summary of the results:

| <u>Thickness</u> | <u>Ex. 1</u> | <u>Ex. 6</u> | | <u>Ex. 2</u> | <u>Ex. 7</u> | | <u>Ex. 15</u> | <u>Ex. 25</u> |
|------------------|--------------|--------------|--|--------------|--------------|--|---------------|---------------|
| approx. 0.6 mm | V-0 | V-0 | | V-0 | V-0 | | V-0 | V-0 |
| approx. 0.4 mm | Rejected | V-0 | | Rejected | V-0 | | V-1 | V-0 |
| approx. 0.2 mm | Rejected | V-0 | | Rejected | V-0 | | Rejected | V-0 |

The examples with an accelerator [D] featuring plural urea bonds per molecule (*Examples 6, 7, 25*) do provide vastly improved results when the laminate has an approximate thickness of 0.4 mm and 0.2 mm. However, both types of accelerator yield V-0 ratings when the laminate has an approximate thickness of 0.6 mm.

Although this data suggests unexpected results, it is not commensurate in scope with the claimed invention - *see MPEP 716.02(d)*. The data relates to laminates having approximate thickness of 0.4 mm and 0.2 mm (*as prepared in Applicants' examples*). However, the instant invention is drawn to: an epoxy resin composition (*see claims 1-4 & 10-12*); a prepreg of unspecified thickness (*see claims 13 & 14*); and a fiber reinforced composite sheet of unspecified thickness (*see claims 15 & 16*).

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- *Argument 2 (pages 16-18 of response)*

In response to applicant's argument that the prior art combination does not identify *flame retardance properties* related to the instantly claimed accelerator [D], the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

Conclusion

16. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

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Communication

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael J. Feely whose telephone number is (571)272-1086. The examiner can normally be reached on M-F 8:30 to 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Harold Y. Pyon can be reached on 571-272-1498. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Michael J Feely/
Primary Examiner, Art Unit 1796

February 15, 2010